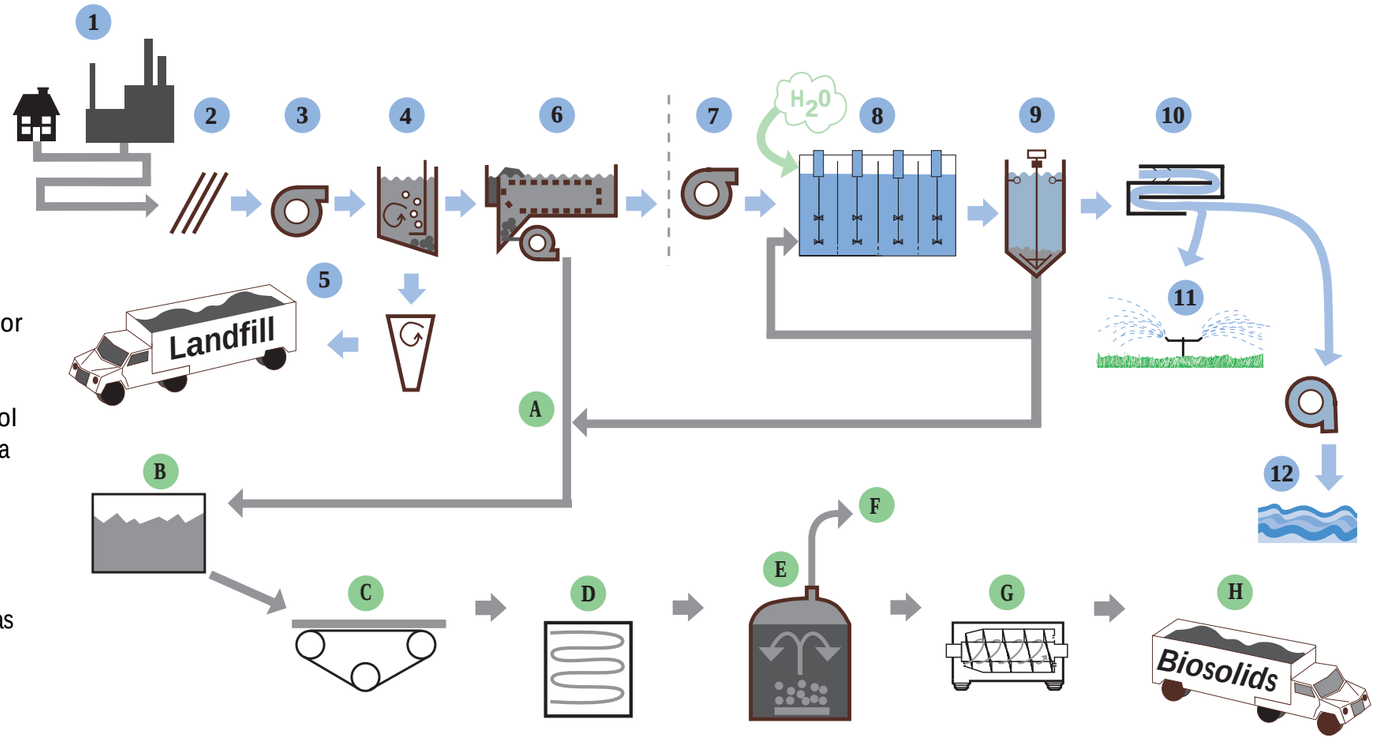
Wastewater Treatment Plant at West Point

Here's what takes place at West Point

- Primary treatment removes about 60 percent of the solid matter by skimming and settling the water.
- Secondary treatment removes most remaining "suspended" solids using a biological process.
- Solids are processed.
- Treated wastewater is either reused or discharged into Puget Sound.



1 Raw sewage is conveyed to the plant through a large ***network of pipes and tunnels***. Pump stations throughout the service area lift the wastewater so that it flows by gravity most of the way. Regulator stations control sudden increases in flow caused by storm water from heavy rains. Operators at the plant monitor and control the system via computer. In the event of a catastrophic plant failure, an emergency bypass gate would open, discharging untreated wastewater directly to Puget Sound through an emergency outfall.

2 ***Bar screens*** remove large objects such as rags and sticks.

3 Four large ***raw sewage pumps*** lift the wastewater to the primary treatment process area, starting with ***grit chambers***
4 where sand and gravel are settled out,
5 dewatered, then removed and ***trucked*** to a landfill.

6 ***Primary clarifiers*** remove floating material with skimmers and allow other solids to fall slowly to the bottom where they are removed. Solids are pumped to a separate processing building. **Primary treatment is now complete.**

7 The primary treated wastewater flows to the ***intermediate pump station*** where it is lifted to the secondary treatment process area. When heavy rains combine with the wastewater, the volume of flow greatly increases at the plant. To protect the biological process during high flow times some excess flow from the primary clarifiers is diverted to the final effluent flow for disinfection (#10).

8 The first step in secondary treatment is to combine the primary treated wastewater with high-purity oxygen – along with active bacteria which "feed" on the dissolved and suspended organic matter in the wastewater. This takes place in huge, underground ***aeration basins***.

9 The wastewater then flows by gravity into 13 round ***secondary clarifiers*** where the bacteria settle to the bottom and are removed. Some bacteria are discarded to the solids facility but most are returned to the aeration basins for reuse.

10 The clear water that flows from these clarifiers is chlorinated, then flows through a ***contact chamber*** to the third and final pumping station. Just before being pumped into the final effluent line, the dechlorination process takes place.

11 A portion of the treated wastewater is treated for a third time, producing higher quality reclaimed water which is then used for plant processes and ***irrigating*** park landscapes.

12 Finally, treated effluent is discharged through an ***outfall to Puget Sound***.

Solids Processing at West Point

A An average 181,000 pounds of solids are removed from the wastewater flow every day. By processing the solids in digesters and with dewatering equipment, two valuable by-products are produced for re-use: methane gas and biosolids.

B Raw organic solids from the primary and secondary clarifiers are blended to a uniform consistency in a ***190,000-gallon tank***.

C Solids are then pumped onto ***machines that have a continuous moving belt***, which acts as a filter to remove some of the water and thicken the solids. The water that seeps through the belt is collected and pumped back into the wastewater flow for treatment.

D The thickened solids are heated to 95°F while being pumped through a hot water ***heat exchanger*** on their way to one of six digesters.

E The ***digesters*** create just the right environment for certain bacteria to break down the pathogens and organic material. This process produces methane gas, a valuable fuel, and reduces the mass of solids by half.

F The ***gas*** is used to run both the engines that drive the four main raw sewage pumps in the plant and engines that produce electricity. Heat from these engines is recovered and normally provides all of the necessary hot water for the plant heat loop. Boilers can also burn the gas to provide backup heat. Excess gas is incinerated.

G After the digestion process is complete, the solids are pumped to ***centrifuges*** that spin more water out. Again, this water is returned to the main plant for treatment.

H At this point, the resulting nutrient-rich product is called ***biosolids***. It is trucked from the plant to be used as agriculture fertilizer or soil conditioner.